AMENDMENTS TO THE SPECIFICATION

Please amend the follow paragraphs as indicated.

[0020] Continuing with FIG. 2, the primary support system is the bearing which comprises the bearing cone [[608]] 208 and the surrounding bearing seat [[610]] 210. The cone and seal define facing surfaces [[612]] 212, [[614]] 214 which are separated by gap [[616]] 216 typically of about five microns (although this dimension is representative of example only; it may be greater or less depending on the tolerances achieved by parts and assembly methods). Fluid fills this gap [[616]] 216, and is maintained under pressure within this gap during relative rotation of the facing surfaces, by grooves [[618]] 218 on the surface of the bearing cone 608.

[0021] To allow for fluid circulation, and maintenance of the fluid in the gap 216, the gap is extended over the back surface 220 of the bearing cone 208 by providing fluid pathways 222 running linearly along the back surface of the cone or the facing surface 224 of the shaft. These pathways 222 allow the fluid to pass axially toward the distal end 226 of the shaft [[500]] 200. The path or bearing gap for the fluid is completed through a gap (see arrow 225) between a wall 227 of the sealing cone 228 and the upper surface 230 of the bearing cone 208. Most efficiently, the path is through grooves 232 formed in the top surface 230 of the bearing cone 208, and between bearing cone 208 and bearing seat 210 (see arrow 209). Most efficiently, the path is through grooves 232 formed in the top surface 230 of the cone 208, although the grooves could also be provided in the complementary surface of the seal cone 228.

[0022] As is shown by the arrows marked Δp on FIG. 2, the pumping action of the grooves 218 on the face of the cone 208 creates a pressure differential from the apex 240 of the bearing cone toward the narrower end 242 of the cone. The pressure gradients, indicated by the arrows 243, 244, [[and]] 245, and 246 labeled Δp, are from higher to lower pressure in the direction of the arrow. With the exception of the pumping sections, Δp and flow are in the same direction. Thus, the fluid flow over the surface of the cone being generally from the point of lower to higher pressure, is as marked by the arrow 244 and continues axially toward the distal end 226 of the shaft following the path marked by arrow 245 and returns to the apex of the cone (not shown) following the pressure arrow 243.

[0023] In order to provide a means for fluid to be inserted into the fluid dynamic bearing, as well as to provide a means for air bubbles to be expelled from the bearing 210, a centrifugal capillary seal 260 is incorporated into the design, leading from the open end 262 of the fixed shaft [[500]] 200 and defined by the surface 261, 263 of relatively rotating parts, and leading down to the apex 240 of cone 208. Details of this design are found in the incorporated application. Basically, as disclosed, the centrifugal capillary seal 260 operates to continuously purge the FDB of any air which might inadvertently enter the system, while very effectively sealing the fluid within the bearing system.

[0024] In order to further enhance the sealing stiffness of the system, a grooved pumping seal [[602]] 202 is provided, typically and preferably immediately axially inward from base [[642]] 242 of the bearing cone, between the bearing cone and the central portion of the shaft where the stator is mounted. This grooved pumping seal [[602]] 202, in a preferred form, can be defined on the face of a central section [[669]] 269 of the bearing seat [[610]] 210 which also supports one surface [[614]] 214 of the fluid dynamic bearing. In a preferred form, this grooved pumping seal comprises an ungrooved surface section or quiet zone [[662]] 262 surrounding a portion of the ungrooved shaft 501 immediately adjacent the base or narrow section [[642]] 242 of the bearing cone, and a grooved pumping region [[664]] 264 which also closely surrounds an ungrooved section of the shaft [[501]] 201 immediately adjacent the quiet zone [[662]] 262. This grooved pumping seal [[602]] 202 is intended to be a low volume, very high stiffness seal. It is a capillary seal which employs active pumping by virtue of the presence of relatively deep grooves in one section [[664]] 264 of the seal to provide very high seal stiffness. Seal stiffness is defined as the change in pressure developed across the seal divided by the axial length of fluid in the seal or Pa/mm (Psi/inch). As used herein, seal stiffness represents the seal's ability to retain fluid in the fluid dynamic bearing.

[0025] When the shaft is at rest, the oil settles into the groove annulus 264 but most of it a does not pass further down the shaft because of the capillary effect of diverging external annulus and the small radial gap between the shaft and rotating sleeve. When the motor spins up, the relative rotation of the shaft 500 and the surrounding section 264 of the grooved pumping seal create the pressure gradient indicated by the arrow Δp, [[266]] 268. This causes oil or fluid to flow out of the grooves into the quiet zone 262 as indicated by the arrow 268. Further, because of this quiet zone 262, there is no pumping action to force the oil out of the quiet zone of the grooved pumping seal into the fluid dynamic bearing, so that the necessary fluid for effective operation of this grooved pumping seal is maintained. Any air bubbles which appear in the quiet zone would tend to be captured by the pressure gradients in the fluid dynamic bearing [[the]] and be expelled from the distal end of the shaft through the centrifugal capillary seal; any further air bubbles which moved into the grooves of the grooved section 264 could be expelled into the interior section of the motor because of the strong pressure gradient created by the rotation of the grooved pumping seal.